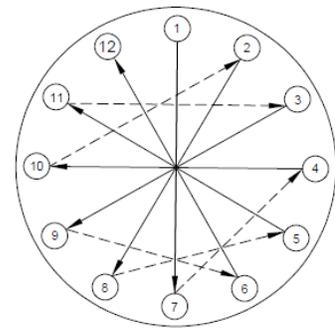




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**APS SUGGESTED SEQUENCE FOR TIGHTENING**

1. Inspect Gasket Kit to ensure Gasket Kit matches the flange size and type for installation.
2. Gasket and kit components must be free from debris or damage.
3. Inspect flange mating faces. Sealing surfaces shall be free from oil, debris, scratches, pitting, rust, and/or gouges greater than the regular machining marks in a circular pattern. Surface finish shall be no greater than 250 RMS.
4. Inspect alignment of flanges to be sure they are concentric (<1/16”) and parallel (<1/32”) to each other. The isolation sleeves should slide completely through bolt holes freely.
5. Inspect the flange gap to ensure that it’s adequate for the gasket installation. A maximum gap of 2x the Gasket thickness between the flange mating faces is recommended.
6. The appropriate tools are needed for this installation, such as safety equipment, a calibrated torque wrench, and non-conductive thread lubricant, if desired.
7. Inspect studs and nuts. Threads shall be clean, free of rust and/or damage, and nut should freely thread onto stud. Studs shall be the necessary length to accommodate double washers.

TO PROVIDE EVEN SEALING PRESSURE ON A FLANGE GASKET IT IS RECOMMENDED THAT THE BOLTS BE “SNUGGED” UP IN THE SEQUENCE SHOWN UNTIL THE FLANGE FACES ARE IN CONTACT WITH THE GASKET. DO NOT EXCEED 20% OF FINAL TORQUE. IF FLANGE FACES FAIL TO CONTACT GASKET AT 20% TORQUE, THE GAP IS TOO LARGE. AFTER THE FLANGE FACES ARE IN CONTACT WITH THE GASKET, TIGHTEN THE BOLTS TO 30% OF THE FINAL TORQUE AND REPEAT TO 50%-60% OF FINAL AND THEN PROCEED WITH FINAL TORQUE USING THE SAME SEQUENCE FOR ALL LEVELS.

When installing gaskets and tightened cold, refer to Bolt Tightening Sequence Chart. “Hot Flow” of the gasket material may occur under operating conditions, resulting in loss of Bolt Pressure. It is advisable therefore, to check bolt torque after operating temperature has been reached - preferably at Zero Line Pressure and Ambient Temperature.

**NOTE:** ALTHOUGH THIS DIAGRAM SHOWS 12 BOLTS, THE SAME BASIC PROCEDURE SHOULD BE USED WITH FLANGES HAVING MORE OR LESS BOLTS.

**NOTICE:** GASKETS, DO NOT GREASE SEAL PRIOR TO INSTALLATION. The gasket seating surface should be free from defects per ASTM PCC-1 and the surface finish should not exceed 250 AARH.

**APS Suggested Sequence for Tightening**

Suggested Installation Torque Values using Friction Coefficient with a Bolt Stress of 30 ksi.

PTFE Coated f=0.07 (k=0.11)			Typ. Lubr. f=0.10 (k=0.15)		Oiled f=0.15 (k=0.19)		Zinc Plated f=0.25 (k=0.29)	
Bolt Dia. (Inches)	Torque (ft-lbs)	Torque (N-m)	Torque (ft-lbs)	Torque (N-m)	Torque (ft-lbs)	Torque (N-m)	Torque (ft-lbs)	Torque (N-m)
1/2	20	27	25	34	35	47	50	68
5/8	40	54	50	68	65	88	100	136
3/4	70	95	90	122	120	163	180	244
7/8	110	149	140	190	190	258	295	400
1	165	224	210	285	290	393	440	597
1 1/8	245	332	310	420	420	569	645	875
1 1/4	345	468	435	590	595	807	905	1,227
1 3/8	465	630	595	807	805	1,091	1,230	1,668
1 1/2	615	834	785	1,064	1,065	1,444	1,620	2,196
1 5/8	795	1,078	1,010	1,369	1,370	1,857	2,090	2,834
1 3/4	1,000	1,356	1,275	1,729	1,730	2,346	2,640	3,579
1 7/8	1,245	1,688	1,585	2,149	2,150	2,915	3,280	4,447
2	1,525	2,068	1,940	2,630	2,630	3,566	4,015	5,444
2 1/4	2,200	2,983	2,800	3,796	3,800	5,152	5,805	7,871
2 1/2	3,055	4,142	3,885	5,267	5,275	7,152	8,050	10,914
2 3/4	4,105	5,566	5,220	7,077	7,085	9,606	10,815	14,663
3	5,370	7,281	6,830	9,260	9,270	12,568	14,150	19,185
3 1/4	6,870	9,314	8,740	11,850	11,865	16,087	18,110	24,554
3 1/2	8,625	11,694	10,980	14,887	14,900	20,202	22,745	30,838
3 3/4	10,660	14,453	13,570	18,398	18,415	24,967	28,110	38,112
4	12,995	17,619	16,540	22,425	22,445	30,431	34,255	46,444

Advance Products & Systems does not take responsibility for any of these torque values, they’re theoretical values. These bolt values are intended for use as guidelines only and are based on ideal conditions, perfect flanges, flange alignment & new bolts/nuts according to the national boiler code, installed in accordance with the APS Flange Sequence Procedure. Torque values are based on API 6A Annex D “Recommended flange bolt torque”. Refer to document for more information. Rev 06/30/22